Spinal Cord Injury Preclinical Data Workshop: Developing a FAIR Share Community

Background: Preclinical research in spinal cord injury (SCI) has improved understanding of mechanisms of primary and secondary injury and enabled concept testing of many strategies for repair. However, this approach has been less successful for the identification of robust leads for therapeutic development. Countless variables including injury mechanics, surgical subtleties and species and model differences have contributed to a poor understanding of relative effectiveness for therapeutic interventions (Curt, 2012). After large investments to standardize a preclinical model and outcomes in the 1990s (the Multicenter Animal Spinal Cord Injury Study, 1994-1996) and subsequent completion and publication of 18 replication studies (Steward et al., 2012), the SCI research community is examining new approaches to enhance the value of preclinical SCI research. By improving the quality of research data and enabling data sharing across laboratories, transparency and reproducibility may be improved, and data science and meta-analyses approaches can be applied to open new directions for translation in this challenging field.

Three initiatives are underway with support from NINDS, including: (1) publication of consensus derived minimal reporting standard for preclinical SCI research (MIASCI, Lemmon et al., 2014), (2) contribution to and reuse of preclinical data in a shared database (VISION-SCI) (Nielson et al., 2014, 2015), and (3) creation of a knowledge base and ontology for integration of SCI research data (RegenBase) (Callahan et al. 2016, http://regenbase.org). These community-driven efforts demonstrate that SCI researchers are ready and willing to share and mine preclinical data, and can serve as an example for other research communities.

Among the most relevant activities in the bioinformatics field is an effort to develop quality standards to make data sharing and reuse both feasible and meaningful. A meeting of leaders in the data science community in 2011, known as "The Future of Research Communications and e-Scholarship, (FORCE 11)" took on the task of developing data standard recommendations. This group has recently disseminated the "FAIR Data Principles", whereby data intended for sharing must be Findable (with sufficient explicit metadata), Accessible (open), Interoperable (using standard definitions and elements), and Reusable (meeting community standards, and documented). The Office of Data Science at NIH has endorsed the FAIR Guiding Principles, and plans to incorporate these standards in larger data sharing recommendations and programs (Wilkinson et al, 2016). This workshop will define priorities and directions for ongoing initiatives in preclinical SCI research to expand data sharing within the context of these Principles, including ways to ensure SCI researchers document their experimental designs and report their data effectively. Key stakeholders include preclinical researchers with expertise spanning SCI injury models and species, data science and bioinformatics experts, data repository experts across neurological disease areas, SCI clinicians, editorial board representatives, consumers, and representatives of private and public funding agencies.

Workshop Objectives:

1) To update the NIH/NINDS and the SCI research community on the status, potential and limitations of ongoing data sharing efforts for preclinical research in SCI, with implications for other disease communities.

2) To obtain input from across the SCI preclinical research community regarding incentives and expectations for wider participation in data sharing efforts.

3) To provide the SCI research community with lessons from data sharing efforts in other research areas.

4) To identify the role of preclinical data standards and data sharing in refining the translational pipeline.

Workshop deliverables:

1) Publication of the methods and results of the workshop.
2) Development of a community of users with commitment to data sharing efforts.
3) Refinement of consensus based data standards.
4) Identification of community priorities for data reuse goals and initial case studies.
5) Development of recommendations to refine or build tools for community participation.

Workshop Steering Committee:

Name	Institution
Vance Lemmon, PhD; Co-Chair	University of Miami; Miami, FL USA
Adam Ferguson, PhD; Co-Chair	University of California, San Francisco; San Francisco, CA USA
Karim Fouad, PhD	University of Alberta; Edmonton, Alberta Canada
Alison Callahan, PhD	Stanford University; Palo Alto, CA USA
Phillip Popovich, PhD	Ohio State University; Columbus, OH USA
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